

## 1. ABSTRACT

Three new RF cavities are required to perform multi-batch slip stacking in the Recycler Ring to increase the proton intensity of the NuMI beamline for the NOvA project to study muon to electron neutron oscillations. Two RF cavities will operate at different frequencies, and one will be used as a spare. The cavities are made from high conductivity copper (OFHC) and operate in the quarter-wavelength transverse electromagnetic mode with a length slightly reduced by the gap capacitance at the accelerating voltage end. In this study, we present results from low power measurements of one of these cavities. We used coaxial cables hooked-up to a Network Analyzer to transmit power into its structure and measure the resonant modes. After adjusting the length of the cavity, the fundamental mode which is used to accelerate the beam during slip stacking was measured very close to the desired operational value of 52.809 MHz. The higher order modes of the cavity were also identified and prototype dampers were constructed to test their ability to suppress them. To determine the frequency tuning range of the cavity, tuners were also developed. These RF devices were able to optimize the cavity's performance.